



# Analytical Laboratory

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13339 Hagers Ferry Road  
Huntersville, NC 28078-7929  
McGuire Nuclear Complex - MG03A2  
Phone: 980-875-5245 Fax: 980-875-4349

## Order Summary Report

**Order Number:** J12020424

**Customer Name(s):** Bill Kennedy, Melonie Martin, Wayne Chapman, Tom Johnson

**Customer Address:** 3195 Pine Hall Rd  
Mailcode: Belews Steam Station  
Belews Creek, NC 28012

**Lab Contact:** Jason C Perkins **Phone:** 980-875-5348

**Report Authorized By:** \_\_\_\_\_ **Date:** 3/9/2012  
**(Signature)**

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### Program Comments:

Please contact the Program Manager (Jason C Perkins) with any questions regarding this report.

### Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted.

### Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

*Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)*

### Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

Sample ID's & Descriptions:

Sample ID	Plant/Station	Collection Date and Time	Collected By	Sample Description
2012004589	BELEWS	23-Feb-12 8:00 AM	T. Johnson	FGD Purge Eff
2012004593	BELEWS	23-Feb-12 8:00 AM	T. Johnson	BIOREACTOR 1 INF.
2012004594	BELEWS	23-Feb-12 8:00 AM	T. Johnson	BIOREACTOR 1 INF. BLANK
2012004595	BELEWS	23-Feb-12 8:00 AM	T. Johnson	BIOREACTOR 2 EFF.
2012004596	BELEWS	23-Feb-12 8:00 AM	T. Johnson	BIOREACTOR 2 EFF. BLANK
2012004597	BELEWS	23-Feb-12 8:00 AM	T. Johnson	FILTER BLANK
2012004598	BELEWS	23-Feb-12 8:00 AM	T. Johnson	Trip Blank
7 Total Samples				

# Technical Validation Review

## Checklist:

COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures).

☒ Yes

☐ No

All Results are less than the laboratory reporting limits.

☐ Yes

☒ No

All laboratory QA/QC requirements are acceptable.

☒ Yes

☐ No

The Vendor Laboratories have been qualified by the Analytical Laboratory

Yes

## Report Sections Included:

☒ Job Summary Report

☒ Sample Identification

☒ Technical Validation of Data Package

☒ Analytical Laboratory Certificate of Analysis

☐ Analytical Laboratory QC Report

☒ Sub-contracted Laboratory Results

☐ Customer Specific Data Sheets, Reports, & Documentation

☐ Customer Database Entries

☒ Chain of Custody

☒ Electronic Data Deliverable (EDD) Sent Separately

Reviewed By: DataBase Administrator

Date: 3/9/2012

# Certificate of Laboratory Analysis

*This report shall not be reproduced, except in full.*

**Order # J12020424**

Site: FGD Purge Eff

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004589**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>ALKALINITY</u></b>								
Vendor Parameter	Complete				1	V_PRISM		
<b><u>NITRITE + NITRATE (COLORIMETRIC)</u></b>								
Nitrite + Nitrate (Colorimetric)	12	mg-N/L		0.25	25	EPA 353.2	27-Feb-12 11:42	BGN9034
<b><u>INORGANIC IONS BY IC</u></b>								
Bromide	91	mg/L		5	50	EPA 300.0	01-Mar-12 00:32	JAHERMA
Chloride	5800	mg/L		100	1000	EPA 300.0	01-Mar-12 00:32	JAHERMA
Sulfate	1100	mg/L		100	1000	EPA 300.0	01-Mar-12 00:32	JAHERMA
<b><u>MERCURY (COLD VAPOR) IN WATER</u></b>								
Mercury (Hg)	152	ug/L		5	100	EPA 245.1	06-Mar-12 10:46	AGIBBS
<b><u>Mercury Dissolved (cold vapor) in Water (Filtered)</u></b>								
Mercury (Hg)	< 2.5	ug/L		2.5	50	EPA 245.1	02-Mar-12 10:49	AGIBBS
<b><u>DISSOLVED METALS BY ICP</u></b>								
Manganese (Mn)	5.05	mg/L		0.05	10	EPA 200.7	29-Feb-12 10:47	MHH7131
<b><u>TOTAL RECOVERABLE METALS BY ICP</u></b>								
Boron (B)	185	mg/L		0.5	10	EPA 200.7	07-Mar-12 13:38	DJSULL1
Calcium (Ca)	3670	mg/L		0.1	10	EPA 200.7	07-Mar-12 13:38	DJSULL1
Iron (Fe)	74.6	mg/L		0.1	10	EPA 200.7	07-Mar-12 13:38	DJSULL1
Lithium (Li)	0.095	mg/L		0.05	10	EPA 200.7	07-Mar-12 13:38	DJSULL1
Magnesium (Mg)	574	mg/L		0.05	10	EPA 200.7	07-Mar-12 13:38	DJSULL1
Manganese (Mn)	5.68	mg/L		0.05	10	EPA 200.7	07-Mar-12 13:38	DJSULL1
Potassium (K)	40.8	mg/L		1	10	EPA 200.7	07-Mar-12 13:38	DJSULL1
Sodium (Na)	35.1	mg/L		0.5	10	EPA 200.7	07-Mar-12 13:38	DJSULL1
<b><u>DISSOLVED METALS BY ICP-MS</u></b>								
Selenium (Se)	220	ug/L		10	10	EPA 200.8	07-Mar-12 13:18	MHH7131
<b><u>TOTAL RECOVERABLE METALS BY ICP-MS</u></b>								
Arsenic (As)	104	ug/L		10	10	EPA 200.8	06-Mar-12 12:02	KRICHR
Cadmium (Cd)	< 10	ug/L		10	10	EPA 200.8	06-Mar-12 12:02	KRICHR
Chromium (Cr)	169	ug/L		10	10	EPA 200.8	06-Mar-12 12:02	KRICHR
Copper (Cu)	71.6	ug/L		10	10	EPA 200.8	06-Mar-12 12:02	KRICHR
Nickel (Ni)	122	ug/L		10	10	EPA 200.8	06-Mar-12 12:02	KRICHR
Selenium (Se)	3480	ug/L		10	10	EPA 200.8	06-Mar-12 12:02	KRICHR
Silver (Ag)	< 10	ug/L		10	10	EPA 200.8	06-Mar-12 12:02	KRICHR
Zinc (Zn)	127	ug/L		10	10	EPA 200.8	06-Mar-12 12:02	KRICHR

# Certificate of Laboratory Analysis

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*This report shall not be reproduced, except in full.***Order # J12020424**

Site: FGD Purge Eff

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004589**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>Speciation of an Element</u></b>								
Vendor Parameter	Complete				1	V_AS&C		
<b><u>TOTAL DISSOLVED SOLIDS</u></b>								
TDS	19000	mg/L		200	1	SM2540C	28-Feb-12 16:00	TJA7067
<b><u>TOTAL SUSPENDED SOLIDS</u></b>								
TSS	3200	mg/L		250	1	SM2540D	27-Feb-12 11:48	AGIBBS

Site: BIOREACTOR 1 INF.

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004593**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>ALKALINITY</u></b>								
Vendor Parameter	Complete				1	V_PRISM		
<b><u>NITRITE + NITRATE (COLORIMETRIC)</u></b>								
Nitrite + Nitrate (Colorimetric)	11	mg-N/L		0.25	25	EPA 353.2	27-Feb-12 11:46	BGN9034
<b><u>INORGANIC IONS BY IC</u></b>								
Bromide	96	mg/L		5	50	EPA 300.0	01-Mar-12 00:48	JAHERMA
Chloride	6600	mg/L		100	1000	EPA 300.0	01-Mar-12 00:48	JAHERMA
Sulfate	1300	mg/L		100	1000	EPA 300.0	01-Mar-12 00:48	JAHERMA
<b><u>MERCURY 1631</u></b>								
Vendor Parameter	Complete				1	V_BRAND		
<b><u>MERCURY (COLD VAPOR) IN WATER</u></b>								
Mercury (Hg)	< 2.5	ug/L		2.5	50	EPA 245.1	06-Mar-12 10:48	AGIBBS
<b><u>Mercury Dissolved (cold vapor) in Water (Filtered)</u></b>								
Mercury (Hg)	< 2.5	ug/L		2.5	50	EPA 245.1	02-Mar-12 10:52	AGIBBS
<b><u>DISSOLVED METALS BY ICP</u></b>								
Manganese (Mn)	3.67	mg/L		0.05	10	EPA 200.7	29-Feb-12 10:51	MHH7131

# Certificate of Laboratory Analysis

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*This report shall not be reproduced, except in full.***Order # J12020424**

Site: BIOREACTOR 1 INF.

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004593**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>TOTAL RECOVERABLE METALS BY ICP</u></b>								
Boron (B)	193	mg/L		0.5	10	EPA 200.7	07-Mar-12 13:22	DJSULL1
Calcium (Ca)	3350	mg/L		0.1	10	EPA 200.7	07-Mar-12 13:22	DJSULL1
Iron (Fe)	< 0.1	mg/L		0.1	10	EPA 200.7	07-Mar-12 13:22	DJSULL1
Lithium (Li)	< 0.05	mg/L		0.05	10	EPA 200.7	07-Mar-12 13:22	DJSULL1
Magnesium (Mg)	602	mg/L		0.05	10	EPA 200.7	07-Mar-12 13:22	DJSULL1
Manganese (Mn)	3.79	mg/L		0.05	10	EPA 200.7	07-Mar-12 13:22	DJSULL1
Potassium (K)	20.7	mg/L		1	10	EPA 200.7	07-Mar-12 13:22	DJSULL1
Sodium (Na)	36.5	mg/L		0.5	10	EPA 200.7	07-Mar-12 13:22	DJSULL1
<b><u>DISSOLVED METALS BY ICP-MS</u></b>								
Selenium (Se)	80.5	ug/L		10	10	EPA 200.8	07-Mar-12 13:22	MHH7131
<b><u>TOTAL RECOVERABLE METALS BY ICP-MS</u></b>								
Arsenic (As)	< 10	ug/L		10	10	EPA 200.8	06-Mar-12 12:05	KRICHR
Cadmium (Cd)	< 10	ug/L		10	10	EPA 200.8	06-Mar-12 12:05	KRICHR
Chromium (Cr)	< 10	ug/L		10	10	EPA 200.8	06-Mar-12 12:05	KRICHR
Copper (Cu)	< 10	ug/L		10	10	EPA 200.8	06-Mar-12 12:05	KRICHR
Nickel (Ni)	36.5	ug/L		10	10	EPA 200.8	06-Mar-12 12:05	KRICHR
Selenium (Se)	74.5	ug/L		10	10	EPA 200.8	06-Mar-12 12:05	KRICHR
Silver (Ag)	< 10	ug/L		10	10	EPA 200.8	06-Mar-12 12:05	KRICHR
Zinc (Zn)	< 10	ug/L		10	10	EPA 200.8	06-Mar-12 12:05	KRICHR
<b><u>Speciation of an Element</u></b>								
Vendor Parameter	Complete				1	V_AS&C		

Site: BIOREACTOR 1 INF. BLANK

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004594**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>MERCURY 1631</u></b>								
Vendor Parameter	Complete				1	V_BRAND		

Site: BIOREACTOR 2 EFF.

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004595**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>ALKALINITY</u></b>								
Vendor Parameter	Complete				1	V_PRISM		

# Certificate of Laboratory Analysis

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*This report shall not be reproduced, except in full.***Order # J12020424**

Site: BIOREACTOR 2 EFF.

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004595**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>NITRITE + NITRATE (COLORIMETRIC)</u></b>								
Nitrite + Nitrate (Colorimetric)	< 0.01	mg-N/L		0.01	1	EPA 353.2	27-Feb-12 11:47	BGN9034
<b><u>INORGANIC IONS BY IC</u></b>								
Bromide	94	mg/L		5	50	EPA 300.0	01-Mar-12 01:04	JAHERMA
Chloride	6900	mg/L		100	1000	EPA 300.0	01-Mar-12 01:04	JAHERMA
Sulfate	1300	mg/L		100	1000	EPA 300.0	01-Mar-12 01:04	JAHERMA
<b><u>MERCURY 1631</u></b>								
Vendor Parameter	Complete				1	V_BRAND		
<b><u>MERCURY (COLD VAPOR) IN WATER</u></b>								
Mercury (Hg)	< 1	ug/L		1	20	EPA 245.1	06-Mar-12 10:50	AGIBBS
<b><u>Mercury Dissolved (cold vapor) in Water (Filtered)</u></b>								
Mercury (Hg)	< 2.5	ug/L		2.5	50	EPA 245.1	02-Mar-12 10:54	AGIBBS
<b><u>DISSOLVED METALS BY ICP</u></b>								
Manganese (Mn)	5.31	mg/L		0.05	10	EPA 200.7	29-Feb-12 10:54	MHH7131
<b><u>TOTAL RECOVERABLE METALS BY ICP</u></b>								
Boron (B)	233	mg/L		0.5	10	EPA 200.7	07-Mar-12 13:26	DJSULL1
Calcium (Ca)	3460	mg/L		0.1	10	EPA 200.7	07-Mar-12 13:26	DJSULL1
Iron (Fe)	< 0.1	mg/L		0.1	10	EPA 200.7	07-Mar-12 13:26	DJSULL1
Lithium (Li)	< 0.05	mg/L		0.05	10	EPA 200.7	07-Mar-12 13:26	DJSULL1
Magnesium (Mg)	695	mg/L		0.05	10	EPA 200.7	07-Mar-12 13:26	DJSULL1
Manganese (Mn)	5.79	mg/L		0.05	10	EPA 200.7	07-Mar-12 13:26	DJSULL1
Potassium (K)	27.1	mg/L		1	10	EPA 200.7	07-Mar-12 13:26	DJSULL1
Sodium (Na)	40.8	mg/L		0.5	10	EPA 200.7	07-Mar-12 13:26	DJSULL1
<b><u>TOTAL RECOVERABLE METALS BY ICP-MS</u></b>								
Arsenic (As)	< 5	ug/L		5	5	EPA 200.8	06-Mar-12 12:09	KRICHR
Cadmium (Cd)	< 5	ug/L		5	5	EPA 200.8	06-Mar-12 12:09	KRICHR
Chromium (Cr)	< 5	ug/L		5	5	EPA 200.8	06-Mar-12 12:09	KRICHR
Copper (Cu)	< 5	ug/L		5	5	EPA 200.8	06-Mar-12 12:09	KRICHR
Nickel (Ni)	< 5	ug/L		5	5	EPA 200.8	06-Mar-12 12:09	KRICHR
Selenium (Se)	< 5	ug/L		5	5	EPA 200.8	06-Mar-12 12:09	KRICHR
Silver (Ag)	< 5	ug/L		5	5	EPA 200.8	06-Mar-12 12:09	KRICHR
Zinc (Zn)	< 5	ug/L		5	5	EPA 200.8	06-Mar-12 12:09	KRICHR
<b><u>Speciation of an Element</u></b>								
Vendor Parameter	Complete				1	V_AS&C		

# Certificate of Laboratory Analysis

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Site: BIOREACTOR 2 EFF. BLANK

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004596**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>MERCURY 1631</u></b>								
Vendor Parameter	Complete				1	V_BRAND		

Site: FILTER BLANK

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004597**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>Mercury Dissolved (cold vapor) in Water (Filtered)</u></b>								
Mercury (Hg)	< 0.05	ug/L		0.05	1	EPA 245.1	06-Mar-12 00:41	AGIBBS
<b><u>DISSOLVED METALS BY ICP</u></b>								
Manganese (Mn)	< 0.005	mg/L		0.005	1	EPA 200.7	29-Feb-12 09:40	MHH7131
<b><u>DISSOLVED METALS BY ICP-MS</u></b>								
Selenium (Se)	< 1	ug/L		1	1	EPA 200.8	07-Mar-12 11:59	MHH7131

Site: Trip Blank

Collection Date: 23-Feb-12 8:00 AM

**Sample #: 2012004598**

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<b><u>TOTAL RECOVERABLE METALS BY ICP</u></b>								
Boron (B)	< 0.05	mg/L		0.05	1	EPA 200.7	07-Mar-12 13:15	DJSULL1
Calcium (Ca)	< 0.01	mg/L		0.01	1	EPA 200.7	07-Mar-12 13:15	DJSULL1
Iron (Fe)	< 0.01	mg/L		0.01	1	EPA 200.7	07-Mar-12 13:15	DJSULL1
Lithium (Li)	< 0.005	mg/L		0.005	1	EPA 200.7	07-Mar-12 13:15	DJSULL1
Magnesium (Mg)	< 0.005	mg/L		0.005	1	EPA 200.7	07-Mar-12 13:15	DJSULL1
Manganese (Mn)	< 0.005	mg/L		0.005	1	EPA 200.7	07-Mar-12 13:15	DJSULL1
Potassium (K)	< 0.1	mg/L		0.1	1	EPA 200.7	07-Mar-12 13:15	DJSULL1
Sodium (Na)	< 0.05	mg/L		0.05	1	EPA 200.7	07-Mar-12 13:15	DJSULL1
<b><u>TOTAL RECOVERABLE METALS BY ICP-MS</u></b>								
Arsenic (As)	< 1	ug/L		1	1	EPA 200.8	06-Mar-12 11:56	KRICAR
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	06-Mar-12 11:56	KRICAR
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	06-Mar-12 11:56	KRICAR
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	06-Mar-12 11:56	KRICAR
Nickel (Ni)	< 1	ug/L		1	1	EPA 200.8	06-Mar-12 11:56	KRICAR
Selenium (Se)	< 1	ug/L		1	1	EPA 200.8	06-Mar-12 11:56	KRICAR
Silver (Ag)	< 1	ug/L		1	1	EPA 200.8	06-Mar-12 11:56	KRICAR
Zinc (Zn)	< 1	ug/L		1	1	EPA 200.8	06-Mar-12 11:56	KRICAR

Certificate of Laboratory Analysis

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Order # J12020424

Site: Trip Blank	Sample #: 2012004598
Collection Date: 23-Feb-12 8:00 AM	Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<u>Speciation of an Element</u>								
Vendor Parameter	Complete				1	V_AS&C		



Full-Service Analytical &  
Environmental Solutions

NC Certification No. 402  
SC Certification No. 99012  
NC Drinking Water Cert No. 37735  
VA Certification No. 1287

## Case Narrative

02/29/2012

Duke Energy Corporation (04)  
Jay Perkins  
13339 Hagers Ferry Road  
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek  
Project No.: J12020424  
Lab Submittal Date: 02/24/2012  
Prism Work Order: 2020577

This data package contains the analytical results for the project identified above and includes a Case Narrative, Sample Results and Chain of Custody. Unless otherwise noted, all samples were received in acceptable condition and processed according to the referenced methods.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative.

Please call if you have any questions relating to this analytical report.

Respectfully,

**PRISM LABORATORIES, INC.**

VP Laboratory Services

Reviewed By

### Data Qualifiers Key Reference:

HT	Sample received and analyzed outside of the hold time.
BRL	Below Reporting Limit
MDL	Method Detection Limit
RPD	Relative Percent Difference
*	Results reported to the reporting limit. All other results are reported to the MDL with values between MDL and reporting limit indicated with a J.

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Client Sample ID	Lab Sample ID	Matrix	Date Sampled	Date Received
2012004589/FGD Purge Eff	2020577-01	Water	02/23/12	02/24/12
2012004593/BioReactor 1 Inf	2020577-02	Water	02/23/12	02/24/12
2012004595/BioReactor 2 Eff	2020577-03	Water	02/23/12	02/24/12

Samples received in good condition at 1.4 degrees C unless otherwise noted.



Duke Energy Corporation (04)  
Attn: Jay Perkins  
13339 Hagers Ferry Road  
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews  
Creek  
Project No.: J12020424  
Sample Matrix: Water

Client Sample ID: 2012004589/FGD Purge Eff  
Prism Sample ID: 2020577-01  
Prism Work Order: 2020577  
Time Collected: 02/23/12 08:00  
Time Submitted: 02/24/12 15:45

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
<b>General Chemistry Parameters</b>									
pH	7.0 HT	pH Units			1	*SM4500-H B	2/28/12 10:20	JAB	P2B0536
Total Alkalinity	59	mg/L	5.0	0.66	1	*SM2320 B	2/28/12 11:30	JAB	P2B0539
Carbonate Alkalinity	BRL	mg/L	5.0	0.66	1	*SM2320 B	2/28/12 11:30	JAB	P2B0540
Bicarbonate Alkalinity	59	mg/L	5.0	0.66	1	*SM2320 B	2/28/12 11:30	JAB	P2B0542



Duke Energy Corporation (04)  
Attn: Jay Perkins  
13339 Hagers Ferry Road  
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews  
Creek  
Project No.: J12020424  
Sample Matrix: Water

Client Sample ID: 2012004593/BioReactor 1 Inf  
Prism Sample ID: 2020577-02  
Prism Work Order: 2020577  
Time Collected: 02/23/12 08:00  
Time Submitted: 02/24/12 15:45

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
<b>General Chemistry Parameters</b>									
pH	6.9 HT	pH Units			1	*SM4500-H B	2/28/12 10:20	JAB	P2B0536
Total Alkalinity	42	mg/L	5.0	0.66	1	*SM2320 B	2/28/12 11:30	JAB	P2B0539
Carbonate Alkalinity	BRL	mg/L	5.0	0.66	1	*SM2320 B	2/28/12 11:30	JAB	P2B0540
Bicarbonate Alkalinity	42	mg/L	5.0	0.66	1	*SM2320 B	2/28/12 11:30	JAB	P2B0542



Duke Energy Corporation (04)  
Attn: Jay Perkins  
13339 Hagers Ferry Road  
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews  
Creek  
Project No.: J12020424  
Sample Matrix: Water

Client Sample ID: 2012004595/BioReactor 2 Eff  
Prism Sample ID: 2020577-03  
Prism Work Order: 2020577  
Time Collected: 02/23/12 08:00  
Time Submitted: 02/24/12 15:45

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
<b>General Chemistry Parameters</b>									
pH	6.8 HT	pH Units			1	*SM4500-H B	2/28/12 10:20	JAB	P2B0536
Total Alkalinity	110	mg/L	5.0	0.66	1	*SM2320 B	2/28/12 11:30	JAB	P2B0539
Carbonate Alkalinity	BRL	mg/L	5.0	0.66	1	*SM2320 B	2/28/12 11:30	JAB	P2B0540
Bicarbonate Alkalinity	110	mg/L	5.0	0.66	1	*SM2320 B	2/28/12 11:30	JAB	P2B0542



Duke Energy Corporation (04)  
Attn: Jay Perkins  
13339 Hagers Ferry Road  
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews  
Creek  
Project No: J12020424

Prism Work Order: 2020577  
Time Submitted: 2/24/2012 3:45:00PM

**General Chemistry Parameters - Quality Control**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P2B0536 - NO PREP</b>									
<b>LCS (P2B0536-BS1)</b>				Prepared & Analyzed: 02/28/12					
pH	6.81		pH Units	6.860		99	99-101		
<b>Batch P2B0539 - NO PREP</b>									
<b>Blank (P2B0539-BLK1)</b>				Prepared & Analyzed: 02/28/12					
Total Alkalinity	BRL	5.0	mg/L						
<b>LCS (P2B0539-BS1)</b>				Prepared & Analyzed: 02/28/12					
Total Alkalinity	254	5.0	mg/L	250.0		102	90-110		
<b>LCS Dup (P2B0539-BSD1)</b>				Prepared & Analyzed: 02/28/12					
Total Alkalinity	253	5.0	mg/L	250.0		101	90-110	0.4	200
<b>Batch P2B0540 - NO PREP</b>									
<b>Blank (P2B0540-BLK1)</b>				Prepared & Analyzed: 02/28/12					
Carbonate Alkalinity	BRL	5.0	mg/L						
<b>LCS (P2B0540-BS1)</b>				Prepared & Analyzed: 02/28/12					
Carbonate Alkalinity	254	5.0	mg/L				90-110		
<b>LCS Dup (P2B0540-BSD1)</b>				Prepared & Analyzed: 02/28/12					
Carbonate Alkalinity	253	5.0	mg/L				90-110	0.4	200
<b>Batch P2B0542 - NO PREP</b>									
<b>Blank (P2B0542-BLK1)</b>				Prepared & Analyzed: 02/28/12					
Bicarbonate Alkalinity	BRL	5.0	mg/L						



Duke Energy Corporation (04)  
Attn: Jay Perkins  
13339 Hagers Ferry Road  
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews  
Creek  
Project No: J12020424


Prism Work Order: 2020577  
Time Submitted: 2/24/2012 3:45:00PM

General Chemistry Parameters - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P2B0542 - NO PREP</b>										
<b>LCS (P2B0542-BS1)</b>				Prepared & Analyzed: 02/28/12						
Bicarbonate Alkalinity	254	5.0	mg/L	250.0		102	90-110			
<b>LCS Dup (P2B0542-BSD1)</b>				Prepared & Analyzed: 02/28/12						
Bicarbonate Alkalinity	253	5.0	mg/L	250.0		101	90-110	0.4	200	

## Page 17 of 33

<sup>19</sup>Page 1 of 2  
DISTRIBUTION  
ORIGINAL to LAB,  
COPY to CLIENT

		<b>Duke Energy Analytical Laboratory</b> Mail Code MGO3A2 (Building 7405) 13339 Hagers Ferry Rd Huntersville, N. C. 28078 (704) 875-5245 Fax: (704) 875-4349	
1) Project Name	HAPS/MACT Testing Belews Creek	2) Phone No:	
2) Client:	Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson	4) Fax No:	
5) Business Unit:	20003	6) Process:	3500
8) Oper. Unit:	BC00	9) Res. Type:	69400
		10) Project ID:	MACTCAR

Analytical Laboratory Use Only											
LIMS # <i>J12020424</i>			Matrix: <b>OTHER</b>			Samples Originating From			NC <input checked="" type="checkbox"/> SC <input type="checkbox"/>		
Logged By <i>Am</i>			Date & Time <i>2-24-12 10:55</i>			SAMPLE PROGRAM			Ground Water NPDES <input type="checkbox"/>		
Vendor AS&C			PO#			Drinking Water <input type="checkbox"/>			UST RCRA <input type="checkbox"/>		
			Cooler Temp (C) <i>4.0</i>			Waste <input type="checkbox"/>					
Vendor: <b>PRISM</b>			<sup>15</sup> Preserv.: 1=HCL 2=H <sub>2</sub> SO <sub>4</sub> 3=HNO <sub>3</sub> 4=Ice 5=None			4			3		
PO#						3			3		
						4			None		
									4		

**Customer to complete all appropriate non-shaded areas.**

LAB USE ONLY	
<sup>11</sup> Lab ID	
201200458	
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[illegible]

1) Relinquished By <i>Tom Johnson</i>	Date/Time <i>2/23/12</i>	4) Accepted By <i>A. Miller</i>	Date/Time <i>2-24-12 10:15</i>
3) Relinquished By <i>Colin</i>	Date/Time <i>2-24-12 10:15</i>	5) Accepted By <i>David Mori</i>	Date/Time <i>2-24-12 15:00</i>
5) Relinquished By <i>Charles T. Mori</i>	Date/Time <i>2-24-12 15:00</i>	7) Accepted By <i>David Mori</i>	Date/Time <i>2-24-12 15:45</i>
7) Relinquished By <i>David Mori</i>	Date/Time <i>2-24-12 15:45</i>	9) Accepted By <i>David Mori</i>	Date/Time <i>2-24-12 15:45</i>
9) Seal/Locked By <i>David Mori</i>	Date/Time <i>2-24-12 15:45</i>	10) Seal/Lock Opened By <i>David Mori</i>	Date/Time <i>2-24-12 15:45</i>
11) Seal/Locked By <i>David Mori</i>	Date/Time <i>2-24-12 15:45</i>	12) Seal/Lock Opened By <i>David Mori</i>	Date/Time <i>2-24-12 15:45</i>
Comments <i>#593 alk - was mis-labeled</i>			
* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, Fe, K, Li, Mg, Mn, Na.			

22 Requested Turnaround

14 Days \_\_\_\_\_

\*7 Days \_\_\_\_\_

- 48 Hr \_\_\_\_\_

\*Other 3-5-12  
Add. Cost Will Apply

24255:

March 6, 2012

Duke Energy  
ATTN: Jay Perkins  
Scientific Support-Laboratory  
13339 Hagers Ferry Road  
Huntersville NC 28078  
jcperkins@duke-energy.com  
labcustomer@duke-energy.com

RE: Project DUK-HV1201

Client Project: J12020424

Dear Mr. Perkins,

On February 28, 2012, Brooks Rand Labs (BRL) received two (2) wastewater samples and two (2) corresponding field blanks. Samples were logged-in for total mercury (Hg) analysis. All samples were received, prepared, analyzed, and stored according to BRL SOPs and EPA methodology.

The results were blank-corrected as described in the calculations section of the applicable SOP(s) and may be evaluated using adjusted reporting limits to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific detection limits and other details.

No qualification of the data was warranted, aside from concentration qualifiers, and all associated quality control sample results met the acceptance criteria.

BRL, an accredited laboratory, certifies the reported results of all analyses for which BRL is NELAP accredited meet all NELAP requirements. For more details, see the *Report Information* page of the report. Please feel free to contact me if you have any questions regarding this report.

Sincerely,



Tiffany Stilwater  
Project Manager  
tiffany@brooksrand.com

## Report Information

### Laboratory Accreditation

BRL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BRL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksrand.com/default.asp?contentID=586>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

<b>BLK</b>	method blank	<b>MS</b>	matrix spike
<b>BRL</b>	Brooks Rand Labs	<b>MSD</b>	matrix spike duplicate
<b>BS</b>	laboratory fortified blank	<b>ND</b>	non-detect
<b>CAL</b>	calibration standard	<b>NR</b>	non-reportable
<b>CCV</b>	continuing calibration verification	<b>PS</b>	post preparation spike
<b>COC</b>	chain of custody record	<b>REC</b>	percent recovery
<b>CRM</b>	certified reference material	<b>RPD</b>	relative percent difference
<b>D</b>	dissolved fraction	<b>RSD</b>	relative standard deviation
<b>DUP</b>	duplicate	<b>SCV</b>	secondary calibration verification
<b>ICV</b>	initial calibration verification	<b>SOP</b>	standard operating procedure
<b>MDL</b>	method detection limit	<b>SRM</b>	standard reference material
<b>MRL</b>	method reporting limit	<b>T</b>	total recoverable fraction

### Definition of Data Qualifiers

(Effective 9/23/09)

<b>B</b>	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
<b>E</b>	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
<b>H</b>	Holding time and/or preservation requirements not met. Result is estimated.
<b>J</b>	Estimated value. A full explanation is presented in the narrative.
<b>J-M</b>	Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.
<b>J-N</b>	Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.
<b>M</b>	Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.
<b>N</b>	Spike recovery was not within acceptance criteria. Result is estimated.
<b>R</b>	Rejected, unusable value. A full explanation is presented in the narrative.
<b>U</b>	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
<b>X</b>	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Rand, Ltd., those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses; USEPA; July 2002. These supersede all previous qualifiers ever employed by BRL.

## Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
BioReactor 1 Inf	1209007-01	Influent	Sample	02/23/2012	02/28/2012
BioReactor 1 Inf Hg Blk	1209007-02	DIW	Field Blank	02/23/2012	02/28/2012
BioReactor 2 Eff	1209007-03	Effluent	Sample	02/23/2012	02/28/2012
BioReactor 2 Eff Hg Blk	1209007-04	DIW	Field Blank	02/23/2012	02/28/2012

## Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
Hg	Water	EPA 1631	03/01/2012	03/02/2012	B120305	1200143

## Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
<b>BioReactor 1 Inf</b>										
1209007-01	Hg	Influent	T	89.7		15.2	40.4	ng/L	B120305	1200143
<b>BioReactor 1 Inf Hg Blk</b>										
1209007-02	Hg	DIW	T	0.15	U	0.15	0.40	ng/L	B120305	1200143
<b>BioReactor 2 Eff</b>										
1209007-03	Hg	Effluent	T	13.1		0.49	1.31	ng/L	B120305	1200143
<b>BioReactor 2 Eff Hg Blk</b>										
1209007-04	Hg	DIW	T	0.15	U	0.15	0.40	ng/L	B120305	1200143

## Accuracy & Precision Summary

Batch: B120305  
Lab Matrix: Water  
Method: EPA 1631

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B120305-SRM1	Certified Reference Material (1209009, NIST 1641d 1000x dilution)						
	Hg		15.68	14.20	ng/L	91% 85-115	
B120305-MS1	Matrix Spike (1209007-03)						
	Hg	13.07	66.87	89.09	ng/L	114% 71-125	
B120305-MSD1	Matrix Spike Duplicate (1209007-03)						
	Hg	13.07	66.59	78.67	ng/L	99% 71-125	12% 24

## Method Blanks & Reporting Limits

Batch: B120305  
Matrix: Water  
Method: EPA 1631  
Analyte: Hg

Sample	Result	Units		
B120305-BLK1	0.05	ng/L		
B120305-BLK2	0.04	ng/L		
B120305-BLK3	0.05	ng/L		
B120305-BLK4	0.04	ng/L		
Average: 0.05		Standard Deviation: 0.01		MDL: 0.15
Limit: 0.50		Limit: 0.10		MRL: 0.40

## Instrument Calibration

Sequence: 1200143  
Instrument: THG-10  
Date: 03/02/2012  
Analyte: Hg

Total Mercury and Mercury Speciation by CVAFS  
Method: EPA 1631

Lab ID	True Value	Result	Units	REC & Limits	
1200143-IBL1		4.31	pg of Hg		
1200143-IBL2		5.64	pg of Hg		
1200143-IBL3		4.09	pg of Hg		
1200143-IBL4		4.40	pg of Hg		
1200143-CAL1	25.00	24.21	pg of Hg	97%	
1200143-CAL2	100.0	101.4	pg of Hg	101%	
1200143-CAL3	500.0	465.0	pg of Hg	93%	
1200143-CAL4	2500	2704	pg of Hg	108%	
1200143-CAL5	10000	10190	pg of Hg	102%	
1200143-ICV1	1568	1420	pg of Hg	91%	85-115
1200143-CCV1	500.0	439.0	pg of Hg	88%	77-123
1200143-CCB1		5.93	pg of Hg		
1200143-CCV2	500.0	533.6	pg of Hg	107%	77-123
1200143-CCV3	500.0	465.8	pg of Hg	93%	77-123
1200143-CCV4	500.0	488.3	pg of Hg	98%	77-123
1200143-CCV5	500.0	532.5	pg of Hg	107%	77-123



## Sample Containers

<b>Lab ID:</b> 1209007-01			<b>Report Matrix:</b> Influent			<b>Collected:</b> 02/23/2012	
<b>Sample:</b> BioReactor 1 Inf			<b>Sample Type:</b> Sample			<b>Received:</b> 02/28/2012	
<b>Des</b>	<b>Container</b>	<b>Size</b>	<b>Lot</b>	<b>Preservation</b>	<b>P-Lot</b>	<b>pH</b>	<b>Ship. Cont.</b>
A	Bottle FLPE Hg-T	250mL	71470160 10	none	n/a		Cooler
<b>Lab ID:</b> 1209007-02			<b>Report Matrix:</b> DIW			<b>Collected:</b> 02/23/2012	
<b>Sample:</b> BioReactor 1 Inf Hg Blk			<b>Sample Type:</b> Field Blank			<b>Received:</b> 02/28/2012	
<b>Des</b>	<b>Container</b>	<b>Size</b>	<b>Lot</b>	<b>Preservation</b>	<b>P-Lot</b>	<b>pH</b>	<b>Ship. Cont.</b>
A	Bottle FLPE Hg-T	250mL	71470160 10	none	n/a		Cooler
<b>Lab ID:</b> 1209007-03			<b>Report Matrix:</b> Effluent			<b>Collected:</b> 02/23/2012	
<b>Sample:</b> BioReactor 2 Eff			<b>Sample Type:</b> Sample			<b>Received:</b> 02/28/2012	
<b>Des</b>	<b>Container</b>	<b>Size</b>	<b>Lot</b>	<b>Preservation</b>	<b>P-Lot</b>	<b>pH</b>	<b>Ship. Cont.</b>
A	Bottle FLPE Hg-T	500mL	71490150 70	none	n/a		Cooler
<b>Lab ID:</b> 1209007-04			<b>Report Matrix:</b> DIW			<b>Collected:</b> 02/23/2012	
<b>Sample:</b> BioReactor 2 Eff Hg Blk			<b>Sample Type:</b> Field Blank			<b>Received:</b> 02/28/2012	
<b>Des</b>	<b>Container</b>	<b>Size</b>	<b>Lot</b>	<b>Preservation</b>	<b>P-Lot</b>	<b>pH</b>	<b>Ship. Cont.</b>
A	Bottle FLPE Hg-T	250mL	71470160 10	none	n/a		Cooler

## Shipping Containers

### Cooler

**Received:** February 28, 2012 8:30  
**Tracking No:** 4726 7966 8805 via FedEx  
**Coolant Type:** Ice  
**Temperature:** 2.8 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No

**Custody seals present?** Yes  
**Custody seals intact?** Yes  
**COC present?** Yes



**Duke Energy**

**Mail Code MGO3A2 (Building 7405)  
13339 Hagers Ferry Rd  
Huntersville, N. C. 28078  
(704) 875-5245  
Fax: (704) 875-4349**

1)Project Name:	HAPS/MACT Testing Belews Creek		2)Phone No:
2) Client:	Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson		4)Fax No:
5)Business Unit:	20003	6)Process:	3500
8)Oper. Unit:	BC00	9)Res. Type:	69400
			MACTCAR

Analytical Laboratory Use Only LIMS # <u>J12020424</u> Matrix: <b>OTHER</b>				Samples Originating From: <u>NO</u> <u>SC</u>	
Logged By: <u>Am</u>		Date & Time: <u>2-24-12 10:55</u>		SAMPLE PROGRAM: <u>Ground Water</u> <u>NPDES</u>	
Vendor: <u>AS&amp;C</u>		<u>4.0</u>		Drinking Water: <u>      </u> <u>LIST</u> <u>      </u> <u>RCRA</u> Waste: <u>      </u>	

19 Page 1 of 2  
DISTRIBUTION  
ORIGINAL to LAB,  
COPY to CLIENT

Vendor: PRISM			Cooler Temp (C)		Preserv.: 1=HCL 2=H <sub>2</sub> SO <sub>4</sub> 3=HNO <sub>3</sub> 4=Ice 5=None		4	3	3	3	4	None	4	4	24															
PO# Brooks Road			MR#		15 Analyses Required		17 Comp.		16 Grab		TDS, TSS		Hg - 245.1		Metals*		Hg, IMS=Se, ICP=Mn (filtered by station)		Se, Speciation, V_ASC		Hg 1631, V_BRand		Carbonate alkalinity, bicarbonate alkalinity, alkalinity, total (4-5), pH - V_Prism		Chloride, Sulfate, Bromide - Dionex		Nitrate-nitrite, C_NO3/NO2			
Customer to complete all appropriate non-shaded areas.			Date		Time		Signature																							
2/23			0800		T Johnson						1		1		1		1		1				1		1		1			
2/23			0800										1		1		1		1		1		1		1		1			
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LAB USE ONLY	
<sup>11</sup> Lab ID	
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Customer to complete, appropriate columns to debit

Customer to Sign & Date below - Fill Out From Left to Right.			
1) Relinquished By	Date/Time	2) Accepted By	Date/Time
Yon Johnson	2/23/12		
3) Relinquished By	Date/Time	4) Accepted By	Date/Time
Collin	2-24-12 10:15	LT Miller	2-28-12 10:1
5) Relinquished By	Date/Time	6) Accepted By	Date/Time
		3/6/12	2/28/12 083
7) Relinquished By	Date/Time	8) Accepted By	Date/Time
9) Seal/Locked By	Date/Time	10) Seal/Lock Opened By	Date/Time
11) Seal/Locked By	Date/Time	12) Seal/Lock Opened By	Date/Time
Comments			
* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, FE, K, Li, Mg, Mn, Na, 1 <sup>st</sup> Mn only			

**CUSTOMER, IMPORTANT!**

22. Requested Turnaround

14 Days \_\_\_\_\_

\*7 Days \_\_\_\_\_

\*48 Hr \_\_\_\_\_

\*Other 3-5/2  
Add. Cost Will Apply



**APPLIED SPECIATION  
AND CONSULTING, LLC**

18804 Northcreek Parkway Bothell, WA, 98011  
Tel: (425) 483-3300 Fax: (425) 483-9818  
[www.appliedspeciation.com](http://www.appliedspeciation.com)

March 6, 2012

Jay Perkins  
Duke Energy Analytical Laboratory  
Mail Code MGO3A2 (Building 7405)  
13339 Hagers Ferry Rd.  
Huntersville, NC 28078  
(704) 875-5245

Project: HAPS/MACT Testing Belews Creek (LIMS # J12020424)

Dear Mr. Perkins,

Attached is the report associated with four (4) aqueous samples submitted for selenium speciation analysis on February 27, 2012. The samples were received in a sealed cooler at -0.3°C on February 28, 2012. Selenium speciation analysis was performed via ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). Any issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell Gerads", written over a light blue horizontal line.

Russell Gerads  
Vice President  
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report prepared for:

Jay Perkins  
Duke Energy Analytical Laboratory  
Mail Code MGO3A2 (Building 7405)  
13339 Hagers Ferry Rd.  
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek (LIMS # J12020424)

March 6, 2012

## 1. Sample Reception

Four (4) aqueous samples in 125mL HDPE bottles (provided by Applied Speciation and Consulting) were submitted for selenium speciation analysis on February 27, 2012. The samples were received on February 28, 2012 in a sealed container at -0.3°C.

The samples were received in a laminar flow clean hood, void of trace metals contamination and ultra-violet radiation, and was designated a discrete sample identifier. An aliquot of each sample was filtered (0.45µm) and each filtrate was stored in a secure, monitored cryofreezer (maintained at a temperature of -80°C) until selenium speciation analysis could be performed via ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS).

## 2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Selenium Speciation Analysis by IC-ICP-CRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into a sealed autosampler vial. No further sample preparation was performed as any chemical alteration of a sample may shift the equilibrium of the system, resulting in changes in speciation ratios.

## 3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of each analytical day. All calibration curves, associated with each species of interest, are

standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

*Selenium Speciation Analysis by IC-ICP-CRC-MS* Each sample for selenium speciation analysis was analyzed by ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS) on March 1, 2012. An aliquot of each sample is injected onto an anion exchange column and mobilized by a basic (pH > 7) gradient. The eluting selenium species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (CRC) containing hydrogen gas which preferentially reacts with interfering ions of the same target mass to charge ratios (m/z). A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

#### 4. Analytical Issues

The overall analyses went well and no significant analytical issues were encountered. All quality control parameters associated with this sample were within acceptance limits.

The estimated method detection limits (eMDLs) for selenite, selenate, and selenocyanate are generated from replicate analyses of the lowest standard in the calibration curve. Not all selenium species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

The eMDL for methylseleninic acid and selenomethionine is calculated from the average eMDL of selenite, selenate, and selenocyanate. The calibration does not contain methylseleninic acid or selenomethionine due to impurities in these standards which would bias the results for other selenium species.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Russell Gerads', with a stylized, flowing script.

Russell Gerads  
Vice President  
Applied Speciation and Consulting, LLC

Selenium Speciation Results for Duke Energy  
 Project Name: HAPS/MACT Testing Belews Creek  
 Contact: Jay Perkins  
 LIMS #J12020424

Date: March 6, 2012  
 Report Generated by: Russell Gerads  
 Applied Speciation and Consulting, LLC

**Sample Results**

Sample ID	Se(IV)	Se(VI)	SeCN	MeSe(IV)	SeMe	Unknown Se Species (n)
FGD Purge Eff	154	55.8	ND (<2.4)	ND (<2.7)	ND (<2.7)	0 (0)
BioReactor 1 Inf	14.3	38.7	ND (<0.59)	2.23	ND (<0.68)	1.42 (1)
BioReactor 2 Eff	ND (<0.81)	ND (<0.63)	ND (<0.59)	ND (<0.68)	ND (<0.68)	0 (0)
Metals Trip Blk	ND (<0.16)	ND (<0.13)	ND (<0.12)	ND (<0.14)	ND (<0.14)	0 (0)

All results reflect the applied dilution and are reported in µg/L

ND = Not detected at the applied dilution

SeCN = Selenocyanate

MeSe(IV) = Methylseleninic acid

SeMe = Selenomethionine

Unknown Se Species = Total concentration of all unknown Se species observed by IC-ICP-MS

n = number of unknown Se species observed

Selenium Speciation Results for Duke Energy  
 Project Name: HAPS/MACT Testing Belews Creek  
 Contact: Jay Perkins  
 LIMS #J12020424

Date: March 6, 2012  
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 Applied Speciation and Consulting, LLC

**Quality Control Summary - Preparation Blank Summary**

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 100x	eMDL 500x	eMDL 2000x
Se(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.16	0.81	3.2
Se(VI)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.13	0.63	2.5
SeCN	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.12	0.59	2.4
MeSe(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.14	0.68	2.7
SeMe	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.14	0.68	2.7

eMDL = Estimated Method Detection Limit

\*Please see narrative regarding eMDL calculations

**Quality Control Summary - Certified Reference Materials**

Analyte (µg/L)	CRM	True Value	Result	Recovery
Se(IV)	LCS	9.57	9.76	102.0
Se(VI)	LCS	9.48	9.17	96.7
SeCN	LCS	8.92	9.23	103.5
MeSe(IV)	LCS	6.47	5.88	90.8
SeMe	LCS	9.32	8.65	92.8

Selenium Speciation Results for Duke Energy  
 Project Name: HAPS/MACT Testing Belews Creek  
 Contact: Jay Perkins  
 LIMS #J12020424

Date: March 6, 2012  
 Report Generated by: Russell Gerads  
 Applied Speciation and Consulting, LLC

**Quality Control Summary - Matrix Duplicates**

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
Se(IV)	Batch QC	1.03	1.09	1.06	5.5
Se(VI)	Batch QC	ND (<0.63)	ND (<0.63)	NC	NC
SeCN	Batch QC	ND (<0.59)	ND (<0.59)	NC	NC
MeSe(IV)	Batch QC	ND (<0.68)	ND (<0.68)	NC	NC
SeMe	Batch QC	ND (<0.68)	ND (<0.68)	NC	NC

ND = Not detected at the applied dilution

NC = Value was not calculated due to one or more concentrations below the eMDL

**Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate**

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
Se(IV)	Batch QC	2780	2768	99.6	2780	2734	98.3	1.3
Se(VI)	Batch QC	2523	2454	97.3	2523	2438	96.7	0.6
SeCN	Batch QC	2288	2150	94.0	2288	2139	93.5	0.5



Duke Energy Analytical Laboratory

Mail Code MG03A2 (Building 7405)

13338 Hagar Ferry Rd

Huntersville, N.C. 28076

(704) 676-5245

Fax: (704) 676-4349

# CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Analytical Laboratory Use Only

Sample: OTHER

NO. 1

SC. 1

ANALYSIS REQUEST

ANALYSIS REQUEST

ANALYSIS REQUEST

ANALYSIS REQUEST

ANALYSIS REQUEST

Page 1 of 2  
DISTRIBUTION  
ORIGINAL TO LAB,  
COPY TO CLIENT

Customer must complete

1) Project Name	HAPS/MACT Testing	2) Client	Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Metronie Martin, Tom Johnson
3) Business Unit	20003	4) Process	3500
5) Project ID	BC00	6) Spec. Type	69400
7) Project ID	MACTCAR	8) Project No.	

LAB USE ONLY	Lab ID
2012004587	

Customer to complete appropriate columns to right

ID	Sample Description or ID	Date	Time	Signature	17 Comp.	18 Grab	19 TDS, TSS	20 Hg - 245.1	21 Metals*	22 Hg, IMS=Se, ICP=Mn (filtered by station)	23 Se, Speciation, V_ASC	24 Hg 1631, V_Brand	25 Carbonate alkalinity, bicarbonate alkalinity, alkalinity, total (4.5), pH - V_Prism	26 Chloride, Sulfate, Bromide - Dionex	27 Nitrate-nitrite, C_NO3/NO2
	FGD Purge Eff	2/23	0800	T Johnson											
	BioReactor 1 Inf	2/23													
	BioReactor 1 Inf Hg Bik	2/23													
	BioReactor 2 Eff	2/23													
	BioReactor 2 Eff Hg Bik	2/23													
	Filter Bik	2/23													
	Metals Trip Bik	2/23													

1) Requested by

2) Requested by

3) Requested by

4) Requested by

5) Requested by

6) Requested by

7) Requested by

8) Requested by

9) Requested by

10) Requested by

11) Requested by

12) Requested by

22 Requested Turnaround

14 Days

7 Days

48 Hr

3-5-12

Other

Metals=TRMINS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn, TRMIGP = B, Ca, Fe, K, Li, Mg, Mn, Na

Customer, IMPORTANT!  
Please indicate desired turnaround.

# CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Page 33 of 33

**Duke Energy Analytical Laboratory**

Mail Code MGO3A2 (Building 7405)  
 13339 Hagers Ferry Rd  
 Huntersville, N. C. 28078  
 (704) 875-5245  
 Fax: (704) 875-4349

**Analytical Laboratory Use Only**

LIMS # 512020424

Logged By Am Date & Time 2-24-12 10:55

Matrix: **OTHER**

Samples Originating From NC  
SC

Vendor: **AS&C**

PO# 4.0

Cooler Temp (C) 4.0

Vendor: **PRISM**

PO# 4

Preserv.: 1=HCL  
 2=H<sub>2</sub>SO<sub>4</sub> 3=HNO<sub>3</sub>  
 4=Ice 5=None

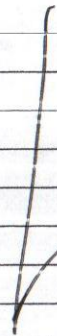
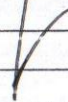
SAMPLE PROGRAM Ground Water

Drinking Water: NPDES UST RCRA

Waste: \_\_\_\_\_

<sup>19</sup>Page 1 of 2  
**DISTRIBUTION**  
 ORIGINAL to LAB,  
 COPY to CLIENT

1) Project Name <b>HAPS/MACT Testing Belews Creek</b>	2) Phone No:	3) Fax No:
2) Client: <b>Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson</b>	4) Fax No:	
5) Business Unit: <b>20003</b>	6) Process: <b>3500</b>	Mail Code:
8) Oper. Unit: <b>BC00</b>	9) Res. Type: <b>69400</b>	10) Project ID: <b>MACTCAR</b>

Vendor: PRISM			16 Preserv.: 1=HCL 2=H2SO4 3=HNO3 4=Ice 5=None		4	3	3	3	4	None	4	4	2,4							
MR #			16 Analyses Required																	
Customer to complete all appropriate non-shaded areas.					17 Comp.	18 Grab	TDS, TSS	Hg - 245.1	Metals*	Hg, IMS=Se, ICP=Mn (filtered by station)	Se, Speciation, V_ASC	Hg 1631, V_BRand	Carbonate alkalinity, bicarbonate alkalinity, alkalinity, total (4.5), pH - V_Prism	Chloride, Sulfate, Bromide - Dionex	Nitrate-nitrite, C_NO3/NO2					
Date	Time	Signature																		
2/23	0800	T Johnson			1	1	1	1	1	1	1	1	1	1	1					
2/23	0800						1	1	1	1	1	1	1	1	1					
2/23																				
2/23							1	1	1**	1	1	1	1	1	1	1				
2/23													1							
2/23																				
2/23									1		1									
2/23																				

**LAB USE ONLY**

11) Lab ID  
2012004589

93  
94  
95  
96  
97  
98

Customer to complete appropriate columns to right

Se Speciation Bottle	ID	13 Sample Description or ID	Date	Time	Signature
		FGD Purge Eff	2/23	0800	T Johnson
		BioReactor 1 Inf	2/23	0800	
		BioReactor 1 Inf Hg Blk	2/23		
		BioReactor 2 Eff	2/23		
		BioReactor 2 Eff Hg Blk	2/23		
		Filter Blk	2/23		
		Metals Trip Blk	2/23		

**Customer to sign & date below - fill out from left to right.**

1) Relinquished By <u>Tom Johnson</u> Date/Time <u>2/23/12</u>	2) Accepted By _____ Date/Time _____
3) Relinquished By <u>Collin</u> Date/Time <u>2-24-12 10:15</u>	4) Accepted By <u>Collin</u> Date/Time <u>2-24-12 10:15</u>
5) Relinquished By _____ Date/Time _____	6) Accepted By _____ Date/Time _____
7) Relinquished By _____ Date/Time _____	8) Accepted By _____ Date/Time _____
9) Seal/Locked By _____ Date/Time _____	10) Seal/Lock Opened By _____ Date/Time _____
11) Seal/Locked By _____ Date/Time _____	12) Seal/Lock Opened By _____ Date/Time _____

Comments \_\_\_\_\_

\* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, FE, K, Li, Mg, Mn, Na, **1\*\* Mn only**

**Customer, IMPORTANT!**  
 Please indicate desired turnaround.

**<sup>22</sup>Requested Turnaround**

14 Days \_\_\_\_\_

\*7 Days \_\_\_\_\_

\*48 Hr \_\_\_\_\_

\*Other 3-5-12  
 Add. Cost Will Apply